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ABSTRACT

Although the primary purpose of this report is to present prototypical procedures for conducting two-year college vocational follow-up studies, it also describes the implementation and results of using these procedures in the evaluation of the electronics, computer science, and tool and manufacturing programs at Los Angeles Pierce College. After providing background on the development of the model, the report considers problems in sampling and the reasons for focusing on program completers. Next, data collection procedures are explained, which involved a highly structured telephone interview to determine course number; program option; course grade; age; sex; ethnicity; number of semesters attended; number of courses completed; objectives in taking courses; judgement about the accomplishment of these objectives; degree/certificate completion; field of employment; work schedule; period when graduate found the job; college presently attending; evaluation of equipment, materials, and instruction; evaluation of usefulness of studies in obtaining a better job, promotion, or raise; and probability of taking more classes. After the methods of data analysis are described, the results of the application of these follow-up procedures at Pierce are presented. The paper concludes with recommendations and conclusions regarding the purposes and value of vocational follow-up for institutional and state purposes. (AYC)

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PATTERN FOR VOCATIONAL FOLLOW-UP

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PATTERN FOR VOCATIONAL FOLLOW-UP

For nine consecutive years the highest priority for research in vocational education has been to conduct follow-up studies. To help meet the need, the Student Accountability Model (SAM) has been developed under the leadership of Ben Gold, Los Angeles City College. SAM identifies vocational students no longer in attendance, classifies them in terms of the completeness and depth with which they have finished work in a vocational area, and suggests procedures for follow-up: contacting them to obtain information about the vocational program in which they were enrolled and about the job opportunities in the field. The accounting modual of SAM is computer generated. For this and other reasons, the SAM system in the Los Angeles Community College District is limited in supplying reasonable follow-up data.

One major research project for the academic year 1980-81 was to develop prototypical procedures for vocational follow-up studies. This paper describes the procedures suggested by the Office of Institutional Research for such follow-up studies. Three departments were used for the development of these procedures: Electronics, Computer Science and Tool and Manufacturing.

Procedures

Sampling

The first problem in performing a vocational follow-up study is to determine which of the many levels of vocational students one wishes to know about. If, for instance, the college were concerned with determining why first-time students selected partic-

ular programs, the sample from whom information would be most valuable would be first-time vocational students. The sampling procedures would involve selecting random groups of beginning classes in each of the target programs and querying students in those classes. Considering the criticisms (quantity, not quality) recently leveled at community college vocational education (Wilms, 1980; Pincus, 1980; and others), it seemed appropriate for the present study to determine the success of former, advanced vocational students (completers). Former students who graduated and are working in the area of study are also in the best position to evaluate elements of the curriculum that we offer, e.g., equipment, materials and instruction. Consequently, only advanced students were sampled for this "prototype development" study.

For each program, the classes suggested for the fourth semester of study were identified from the LAPC catalog. Grade reports from day and evening classes taught in spring, 1980, were obtained, and the students who completed the courses were selected as the sample for this study. It was felt that giving the former students several months after completing the advanced course(s) would permit them a broader perspective and increase the usefulness of their judgments about the programs at college. The classes recommended in the Pierce College catalog to be taken in the fourth semester of an Associate degree program were:

Computer Science	22, 40, 48, 80, 84
Electronics	48, 60, 74
Tool & Manufacturing	32, 33, 37

All of the class sections for each of the courses listed

above were retrieved, and all students who passed these courses in spring, 1980, were identified. For each student a folder was prepared with his name, address, telephone number and specific demographic data, e.g., age and sex. These procedures resulted in the identification of 156 former students from the three programs.

Data Collection

Rather than mailing a questionnaire to each person in the sample, a highly structured telephone interview was developed. Telephone interviewing is cost effective in terms of a resulting sample validity. The cost of small-sample telephone interviewing is only slightly higher per return than mass mailing; more important, telephone interviewing permits a vastly superior quality of data.

The same interview was used for former students from each of the three selected departments with the exception of substituting the appropriate name of the program, i.e., Electronics, Computer Science, and Tool and Manufacturing. A copy of the interview is attached.

For each interview question, a coding system was used for the responses so as to simplify the data analysis. Data were collected on the following variables:

Ticket number of course

Option within the program

Grade in course

Age

Sex

Ethnicity

Number of semesters attended

Number of courses completed

Objective(s) in taking course(s)

Judgment about accomplishment of objective(s)

Completion of degree or certificate

Field in which employed

Hours worked

Period in which student obtained job

College presently attending

Evaluation of vocational program in terms of equipment, materials and instruction

Helpfulness of studies at Pierce in obtaining a better job, promotion or raise

Probability of taking more classes in the area of study

For several of the variables, numerical answers were recorded, e.g., age, number of classes, etc. For others, a Likert-type scale was developed, e.g., evaluation of the curriculum and helpfulness of studies on the job.

Data Analysis

For each of the variables, frequency distributions were made and cross-tabulations were computed with the particular options within programs, i.e., for Computer Science, programming or technology; for Electronics, engineering or radio/television.

Results

Although the purpose of this paper is to develop procedures for continuing follow-up studies for all Pierce College programs, the explicit results for the three programs sampled should be of interest to those concerned with our vocational instruction.

Who Are Our Students and Why Did They Enroll?

The reader should remember that the former students described by these results have completed the highest-level courses in each program. Of the 156 students identified, 110 were reached for an interview. Of these 110 interviews, there were several questions that were inappropriate for part of the sample, e.g., the question, "When did you get your job?," was not asked if the student was not working. For this reason, the numbers reported will vary from table to table. Further, in a very small number of instances, coding errors were made. Such errors tend to account for minor fluctuations in the number of students reported.

Of the 156 students, 69 were in Electronics, 74 in Computer Science, and 13 in Tool and Manufacturing. Of these, 39 were interviewed from Electronics, 65 from Computer Science and 9 from Tool and Manufacturing. Because of the small number in Tool and Manufacturing, the results for this program are not reported separately in the tables.

Table I and II describe the sex and ethnicity of the sample. Overall, 16% of the advanced students in these three areas were women, with Computer Science having a larger proportion than the

other disciplines. The underrepresentation of women is not unexpected since two of the three programs are traditionally, exclusively male, and the third, Computer Science, is largely male.

Table I - Sex

	Male	Female
Electronics	%	%
N = 38	87	11
Computer Science		
N = 65	75	23
Total = All + Tool & Manufacturing	84	16
N = 104		

Table II - Ethnicity

	White	Black	Hispanic	Asian	Others
Electronics	%	%	%	%	%
N = 38	79	-0-	5	11	3
Computer Science					
N = 65	80	-0-	6	8	5
Total = All + Tool & Manufac.	77	-0-	5	10	5
N = 117					

Only small differences exist between the programs in the ethnic background of the students. While the ethnic minorities represent approximately 17% of the total Pierce College population, they represent about 20% of this group of advanced students. The only surprising finding in ethnicity is that there were no Black

students interviewed who were enrolled in, and passed, the advanced courses specified above.

The sample students are considerably older than the general Pierce College student population. The mean (average) age of the total sample is 32.3, with a median (50 percentile) of 29.5. Less than 2% of the students are under 21 years of age. The inter-program differences were minor. The average age for Computer Science was 32.83 and for Electronics, 31.35.

Table III gives the results of the questions, "What was your main reason for taking courses here?" There are no surprises in the data other than the large number of Electronic students (60%) whose intent was to improve skills in their present job. This

Table III - Intent

	Finish AA or certif. & get job	Improve skills present job	Try a new Career	Get a job	Transfer to 4-year college	Hobby/skills (self-interest)
	%	%	%	%	%	%
Electronics N = 37	22	60	3	11	5	-0-
Computer Science N = 63	35	38	11	5	5	6
Total = All + Tool & Manuf. N = 110	30	46	8	8	5	5

alternative was the most popular for the total sample, accounting for 46%. Only 30% of the total group said their intention was to complete an Associate degree or certificate. (A larger proportion actually completed it; see below.) Considering the level of the

courses from which the sample was selected, this is surprising. Also, note that within this group, 5% were preparing to transfer to a baccalaureate program.

Table IV reports the answers to the question, "How well did you do in accomplishing your objective?" The responses are on a five-point Likert-type scale with 1 meaning "Very Well" and 5, "Not at All." In the opinion of the students who were interviewed, their goals were achieved with remarkable success; 90% selected "Very Well" or "Fairly Well," and only 1% chose "To a Limited Extent." None of the interviewees used the response, "Not at All."

Table IV - Accomplish Objectives?

	Very Well	Fairly Well	Partially	To a Limited Extent	Not at All
Electronics	%	%	%	%	%
N = 37	73	14	14	-0-	-0-
Computer Science					
N = 62	61	31	7	2	-0-
Total = All + Tool & Manuf.	66	24	9	1	-0-
N = 100					

Table V gives the proportion of those reporting that they finished an Associate degree or certificate. Of the total sample, 44% responded affirmatively, with one student having received both. The Electronics students were more productive in completing degrees, 54% compared to 37% in Computer Science

Table V - Finish A.A. or Certificate?

	A.A. %	Certificate %	Both %	Neither %
Electronics N = 37	54	-0-	-0-	46
Computer Science N = 63	37	-0-	2	62
Total = All + Tool & Manuf. N = 101	43	-0-	1	56

Each of the respondents was asked to evaluate three aspects of the programs in which they were enrolled: equipment, materials, and instruction. The evaluation took the form of grading A through F. The results of this evaluation appear in Tables VI, VII, and VIII. Each table gives the proportion of grades A through F with the Grade Point Average appearing in the last column. Overall, the former students were rather complimentary about the programs. The lowest grades given were for equipment, with Electronics scoring the lowest of the two programs compared. The highest grades given were for instruction, with Electronics scoring higher than Computer Science, 3.24 as opposed to 3.13. Overall one could say equipment gets a C+, materials and books a B-, and instruction a B+.

Unlike some student evaluations, these data should not be taken lightly. They were made in a structured interview and came from relatively mature students, most of whom were working in the field of study. (See Table IX.) Although our report cards were not "glowing" (no program made the Dean's list), few in the sample assigned poor grades in any of the three categories. A's and B's were assigned by 48% to the equipment, 69% to the materials and

81% for instruction. Considering the source of these judgments, the departments should be pleased.

Table VI - Evaluation - Equipment

	F	D	C	B	A	G.P.A.
	%	%	%	%	%	
Electronics N = 37	8	3	38	38	14	2.46
Computer Science N = 37	2	2	50	39	8	2.50
Total = All + Tool & Manuf. N = 100	4	3	45	38	10	2.47

Table VII - Evaluation - Materials

	F	D	C	B	A	G.P.A.
	%	%	%	%	%	
Electronics N = 37	3	-0-	19	57	22	2.95
Computer Science N = 63	-0-	5	33	46	16	2.71
Total = All + Tool & Manuf. N = 100	1	3	28	50	19	2.82

Table VIII - Evaluation - Instruction

	F	D	C	B	A	G.P.A.
	%	%	%	%	%	
Electronics N = 37	-0-	-0-	24	27	49	3.24
Computer Science N = 63	2	2	14	48	35	3.13
Total = All + Tool & Manuf. N = 101	1	1	18	40	41	3.18

Table IX reports job data about the sample. Overall, 65% were working in jobs in the field they studied, with an additional 6% in a related field. Electronics was significantly higher than Computer Science with 84% working in the field and 11% in a related field. In Computer Science, 14% were engaged in further study and responded, "Student, not looking for a job." This category held 9% of the total sample. There are implications for our placement office in the 22% of former Computer Science students who reported, "Unemployed, looking for a job in the field."

Table IX - Working Now? Job Information

	Job in Field	Job in related field	Job in unrelated field	Unemployed looking for job in field	Student not looking for a job	Retired/ homemaker (not employed)
Electronics	%	%	%	%	%	%
N = 37	84	11	-0-	5	-0-	-0-
Computer Science						
N = 63	54	3	5	22	14	2
Total = All+ Tool & Manuf.	65	6	3	16	9	1
N = 101						

Table X reports when sample members found their jobs. It indicates that 52% of the students had their job before entering Pierce, though only 41% of the Computer Science students fell in that category. An additional 40% of the total sample found their jobs while attending Pierce, and 8% since they had finished. Here again, we have evidence that those considered "completers" had, or obtained jobs in the areas of their studies. These results

represent evidence contrary to the findings of Wilms.

Table X - Did you have this job, or a similar one, before attending this college?

	Before Attending	While Attending	Since Attending
	%	%	%
Electronics N = 35	66	26	9
Computer Science N = 39	41	54	5
Total = All + Tool & Manuf. N = 75	52	40	8

Tables XI, XII, and XIII give the responses to questions asking how helpful study at Pierce College was in obtaining their jobs, promotions, and raises. Overall, 67% found their study, "Very Helpful" or "Moderately Helpful" in obtaining jobs, 58% in obtaining promotions and 49% in obtaining raises. While 44% of the Electronics students considered their studies of no assistance in getting a job, 67% found them of some help in getting a promotion and 69% in getting raises. Of the Computer Science students, 74% found their studies helpful in job placement, but only 50% for promotions and 35% in raises. These data should be considered along with those presented in Table X which reports when jobs were obtained. In Electronics, 66% of the students had jobs before attending Pierce, while only 41% of the Computer Science students fell into that category.

Once again, we find the advanced students who are working in the field found their studies helpful in getting ahead within their

chosen field. And, once again, the reader should keep in mind these are mature students; most of them presently working in the area for which they studied.

Table XI - Helpfulness of Studies - Job Placement

	Very Helpful	Moderately Helpful	Of No Assistance
	%	%	%
Electronics N = 36	39	17	44
Computer Science N = 53	32	42	26
Total = All + Tool & Manuf. N = 100	36	31	33

Table XII - Helpfulness of Studies - Promotion?i

	Very Helpful	Moderately Helpful	Of No Assistance
	%	%	%
Electronics N = 35	46	23	31
Computer Science N = 48	4	46	50
Total = All + Tool & Manuf. N = 83	22	36	42

Table XIII - Helpfulness of Studies - Raise?

	Very Helpful	Moderately Helpful	Of No Assistance
	%	%	%
Electronics N = 35	46	23	31
Computer Science N = 48	8	27	65
Total = All + Tool & Manuf. N = 83	24	25	51

Table XIV presents responses to the question, "How many courses are you presently enrolled in?" In Electronics and Computer Science we have 65% and 40%, respectively, presently enrolled in one or more college courses. Of the total group, 48% attend at least one college course in their field.

Table XIV - How Many College Courses Are You Taking Now?

	% 0	% 1	% 2	% 3	% 4	% 5	% 6
Electronics N = 37	35	32	8	5	5	5	8
Computer Science N = 63	60	13	14	5	3	5	-0-
All = Total + Tool & Manuf. N = 101	52	20	12	5	4	5	3

Table XV shows the responses to the question concerning planned enrollment in classes within the next two years. About half of the total group responded Yes, or Probably Yes, while 78% of the Electronics group fell in this category. The responses to this question should be taken less seriously than those to other questions, since our former students, particularly those who have been successful, frequently feel the pressure to give a socially acceptable response to college representatives, e.g., indicating they will be returning to Pierce College.

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Table IV - Plan on Classes in Next Two Years?

	Definite Yes	Probably Yes	Undecided	Definite No	Probably No
	%	%	%	%	%
Electronics N = 37	62	16	5	3	14
Computer Science N = 63	11	19	32	24	14
Total = All + Tool & Manuf. N = 101	30	19	22	16	14

Summary and Recommendations

The purpose of most vocational follow-up studies in this state is to meet required reporting to the State Chancellor's Offica and hence to the National Center for Educational Statistics (NCES). The results of the follow-up studies are aggregated for community colleges in the state. The numbers reported to the State Chancellor's Office and NCES represent an assessment of the "product" of vocational education. The forms and procedures that are proscribed by NCES are called Vocational Education Data System (VEDS).

As is normally the case, we in the Los Angeles Community College District colleges are in a unique situation. While our administrators of vocational education at the colleges have the responsibility for the ongoing process of vocational education, the district administration for vocational education has

the responsibility and authority for reporting to all governmental agencies. This educational paradox, one group being responsible for the process of vocational instruction and the second group evaluating the process through an examination of the product, negates our using the district data for modification and improvement of our vocational programs. The college vocational administrators have no need to understand the elements of SAM/VEDS, consequently, there is no mandate for them to do follow-up studies. Further, the results of the follow-up studies carried out by LACCD personnel, even if available to the local colleges, would be of little use in program modification because the single purpose of these studies is VEDS reporting. The purpose of this discussion is to advise LAPC Administration and Vocational faculty:

1. The only reason for us, at Pierce College (or any other Los Angeles Community College) to do a vocational follow-up study is to use the results of this product research to make decisions about the process of vocational instruction. If it is determined, a priori, that no changes will occur regardless of the results of a follow-up study, the study should not be done.
2. Each research procedure used for our vocational follow-up studies should be aimed at obtaining information to be used to improve the instructional processes of the program under investigation. To the extent that a single datum cannot be so used, effort and resources are being wasted.

The prototypical follow-up studies do not meet the above criterion. Little of the data that were collected can be used for program modification. However, the major purpose of this project was to develop procedures in, and set a precedent for, carrying out appropriate vocational follow-up studies. With this in mind, the following recommendations are made:

1. There are two categories of former vocational students who can supply data to the administration and vocational faculty for program modification; "completers" and "leavers."
   a. Completers are defined by the SAM/VEDS model as those who have completed high-level courses, degrees or certificates. The prototype study reported above used only completers as respondents.
   b. Leavers are defined by the SAM/VEDS model as those former students who start a vocational program, but leave college having finished little or none of their college work. It is assumed their initial intent was finishing a degree or certificate or learning advanced skills in a specific vocational area. This group, however, withdrew from college before officially completing courses that would indicate their purpose was fulfilled. One can speculate that program evaluation by the leavers might

yield less positive results than those of the prototype study reported above. This group, however, will probably be younger and have little experience in the field of study. As a consequence, their responses might have less content or validity.

2. The procedures used for the selection of completers for the study reported above appear adequate. By using class rosters for advanced classes, one can include a sizeable portion of our advanced vocational students who attend Pierce College to improve skills in their present job, rather than to earn a degree or certificate. These procedures are recommended for further study of completers in other vocational programs. The only recommended change is that a more recent group of completers be used, e.g., a summer study should query those who have completed the advanced courses the previous spring. One can expect, through telephone interviewing, an 80 to 85% return. For the study reported above, 85% of the Computer Science students were, indeed, interviewed. Only 55% of the Electronics students could be reached, even after innumerable attempts and the use of telephone information and the telephone books for disconnected numbers. Using a more recent completer sample would increase the return to almost 90%.

For the follow-up study of leavers, the SAM/VEDS criteria should be used, and the names and telephone numbers may be supplied by the LACCD computer services.

3. From the Pierce College Longitudinal Study, it is known that in any vocational class there are students who have enrolled for many reasons other than to learn job skills. As a consequence, in order to determine which students to sample, some measure of intent must be collected from each student, either during the registration process or early in the semester, as part of the procedures for each vocational class.

In summary, the Pierce College administration must make a decision about whether to expend the time and energy to carry out vocational follow-up studies. The decision need not be dichotomous. One could decide to carry out such studies as needed or requested, as opposed to studying specific programs at regular intervals. Regardless, as implied by the prototype studies and recommendations, each such project requires organized and detailed data gathering.

If the decision of the administration is to conduct careful follow-up studies for each program on a regular basis, I strongly recommend supplementary staffing of the Institutional Research Office with a data clerk specifically assigned to gather and collect the follow-up data under my supervision. A further recommendation would be the purchase of a micro-computer for

data storage and analysis of the many studies that would take place each year.

The last and most important recommendation; if all of the above recommendations are accepted and implemented, the information gathered from vocational follow-up studies will be valueless unless the faculty of the participating departments identify with the studies and are amenable to changes suggested by the study results.

Interview Schedule - Electronics

Name_____

Community_____

Zip Code_____Telephone No._____

Social Security No._____

(For Ethnicity, use the following alternatives:)

1 = White 4 = Asian
2 = Black 5 = Other
3 = Hispanic

COURSE NUMBER ___ ___ ___ ___ (1 2 3 4)

COLLEGE ___ (5)

1 = Pierce
2 = Valley

OPTION ___ (6)

1 = Engineering
2 = Radio, Television

GRADE IN COURSE ___ (7)

AGE ___ ___ (8 9)

SEX ___ (10)

0 = Female
1 = Male

ETHNICITY ___ (11)

How many semesters did you attend here? ___ ___ (12 13)

How many courses did you complete here in ___ ___ (14 15)

1. What was your main reason for taking courses here? ___ (16)

   1 = Finish A.A. or certificate and get a job.
   2 = Improve skills on present job.
   3 = Try a new career.
   4 = Get a job.
   5 = Transfer to a four-year college.
   6 = Hobby skills (self interest).

2. How well did you do in accomplishing your objectives? ___ (17)

   1 = Very well.
   2 = Fairly well.
   3 = Partially.
   4 = To a limited extent.
   5 = Not at all.

3. Did you finish an A.A.; certificate? ___ (18)

   1 = A.A.
   2 = Certificate.
   3 = Both.
   4 = Neither.

4. Are you working now? Tell me about your job? ___ 19

   1 = Job in Electronics.
   2 = Job in related field.
   3 = Job in unrelated field.
   4 = Unemployed; looking for a job in Electronics.
   5 = Student, not looking for a job.
   6 = Retired; homemaker (not employed).

5. How many hours a week do you work? ___ 20 ___ 21

6. Did you have this job, or a similar one before attending this college? ___ 22

   1 = Before attending.
   2 = Got it while attending.
   3 = Got it since finishing

7. How many college courses are you taking now? ___ 23

8. Is your major Electronics? ___ 24

   1 = Yes 2 = No

9. How would say our Electronics department rates in their:

   Equipment, Why?_____ ___ 25

   Materials, Books? Why?_____ ___ 26

   Instruction? Why?_____ ___ 27

   (Use grades A through F:)

   A = 4 C = 2 F = 0
   B = 3 D = 1

   (For questions 10, 11 and 12 below, use the following alternatives.)

   1 = Very helpful.
   2 = Moderately helpful.
   3 = Of no assistance.

10. How helpful were your studies in getting a better job? ___ 28

11. A promotion? ___ 29

12. A raise? ___ 30

13. Do you think you will take any classes in Electronics in the next two years? ___ 31

1 = Definite yes. 3 = Undecided. 5 = Probable no.
2 = Probable yes. 4 = Definite no.

14. If the answer to 13 above was 1, 2 or 3, ask:)

(a.) What Electronic courses do you think you might take?

_____

_____

(b.) Do you know where these courses are offered? ___ 32

1 = Yes, community college. 4 = Yes,(other)._____
2 = Yes, C.S.U.C. _____
3 = Yes, U.C. 5 = Do not know; unsure.

(c.) It has been proposed that an institute, specializing in Electronics and Computer Science, be built in the northern San Fernando Valley. If it were built, would you take Electronic courses there? ___ 33

1 = Definite yes.
2 = Probable yes.
3 = Undecided.
4 = Probable no.
5 = Definite no.

15. Subject: ___ 34

1 = Electronics
2 = Computer Science

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